

# Use of Passive Soil Gas Sampling Devices to Delineate VOC and TPH Impacts in Groundwater – a Case Study

47th Annual  
Environmental Show of the South  
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Prepared by:



Sponsored by:



# Outline

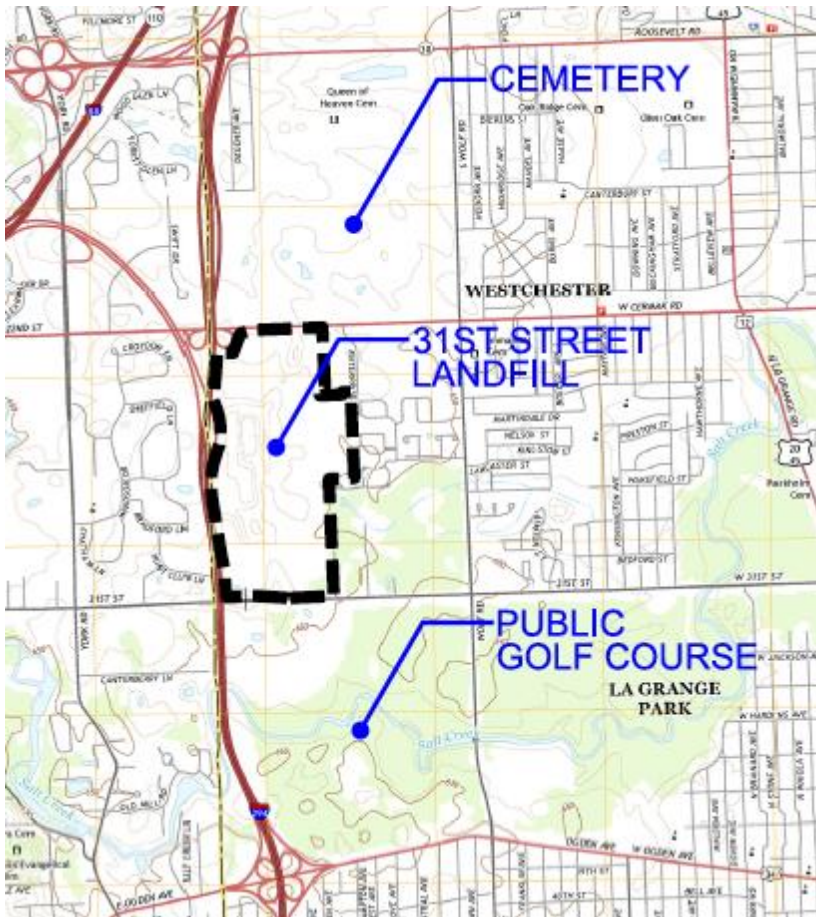
- Introduction and Background
- Use of PSG field investigation techniques and results
- Rough cost comparison between PSG and traditional well installation
- Summary and conclusions

# Introduction

- 31<sup>st</sup> Street Landfill – closed site in northern Illinois
- Recently developed as a private golf club



# Introduction



- Bordered on west & east by residential and commercial
- Bordered on north & south by public golf courses and cemetery

# Golf Course



# Landfill History

- Refuse disposal from the 1930s until about 1982; C&D disposal until about 1986.
- VOC contamination in GW due to landfill gas; Site listed on State Site Remedial Action Plan List (SRAPL).
- GCCS installed as remedial measure in 1999.
- Golf course development in 2010.

# Current Site Conditions



# Current Site Conditions



# Current Site Conditions



# Current Site Conditions



# Golf Course



# Golf Course



# Golf Course



# Golf Course




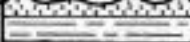

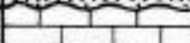
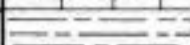



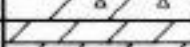

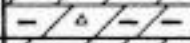
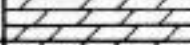

# South of 31<sup>st</sup> Street



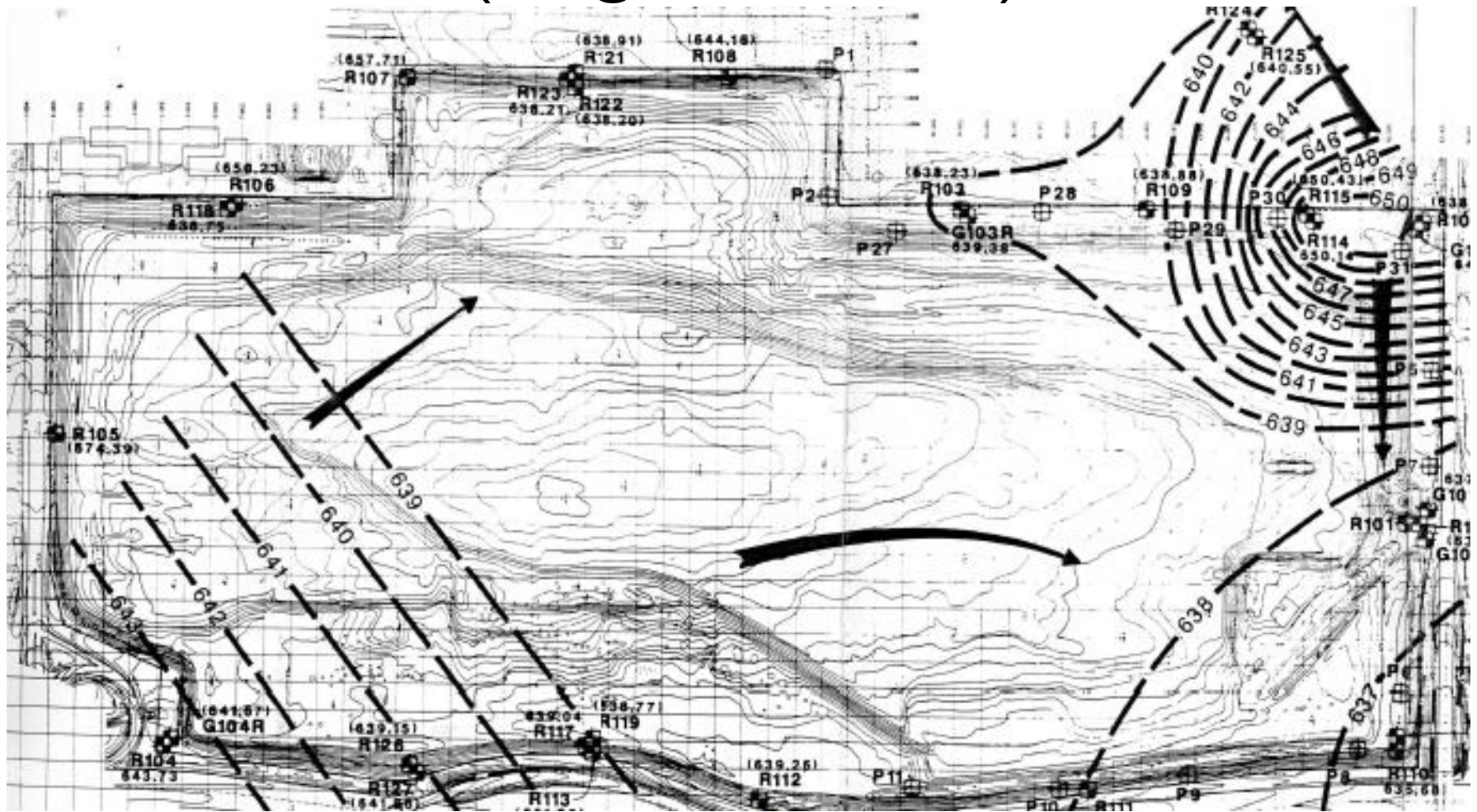
# Typical NE Illinois Geology

## GEOLOGY OF THE CHICAGO AREA

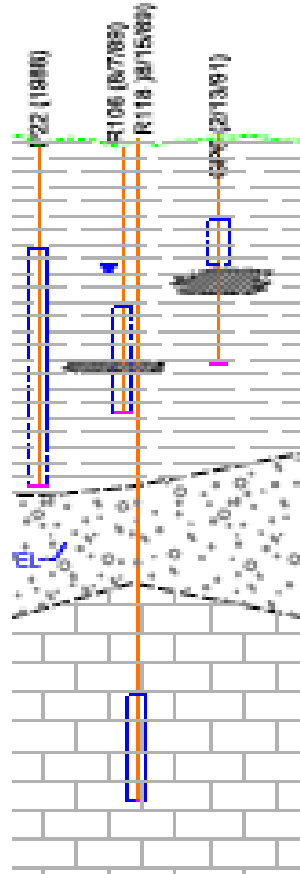
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Time Stratig.			Rock Stratigraphy			GRAPHIC COLUMN	Thickness (Feet)	KINDS OF ROCK		
SYSTEM	SERIES	STAGE	MEGA-GROUP	GROUP	FORMATION					
QUAT.	PLEIS.				(See fig. 15)		0-350	Till, sand, gravel, silt, clay, peat, marl, loess		
PENN.	DESM.			Kewanee	Carbondale		0-125	Shale, sandstone, thin limestone, coal		
					Spoon		50-75	As above, but below No. 2 Coal		
MISS.	VAL.				Burl.-Keokuk		0-700	Limestone	Only in Des Plaines Disturbance	
	KIND.				Hannibal			Shale, siltstone		
DEV.	UP.				Grassy Creek		0-5	Shale in solution cavities in Silurian		
SILURIAN	ALEX. NIAGARAN		Hunton		Racine		0-300	Dolomite, pure in reefs; mostly silty, argillaceous, cherty between reefs		
					Waukesha		0-30	Dolomite, even bedded, slightly silty		
					Joliet		40-60	Dolomite, shaly and red at base; white, silty, cherty above; pure at top		
					Kankakee		20-45	Dolomite, thin beds; green shale partings		
					Edgewood		0-100	Dolomite, cherty, shaly at base where thick		
CIN.	RICH.			Maquoketa	Neda		0-15	Oolite and shale, red		
					Brainard		0-100	Shale, dolomitic, greenish gray		
					Ft. Atkinson		5-50	Dolomite, green shale, coarse limestone		

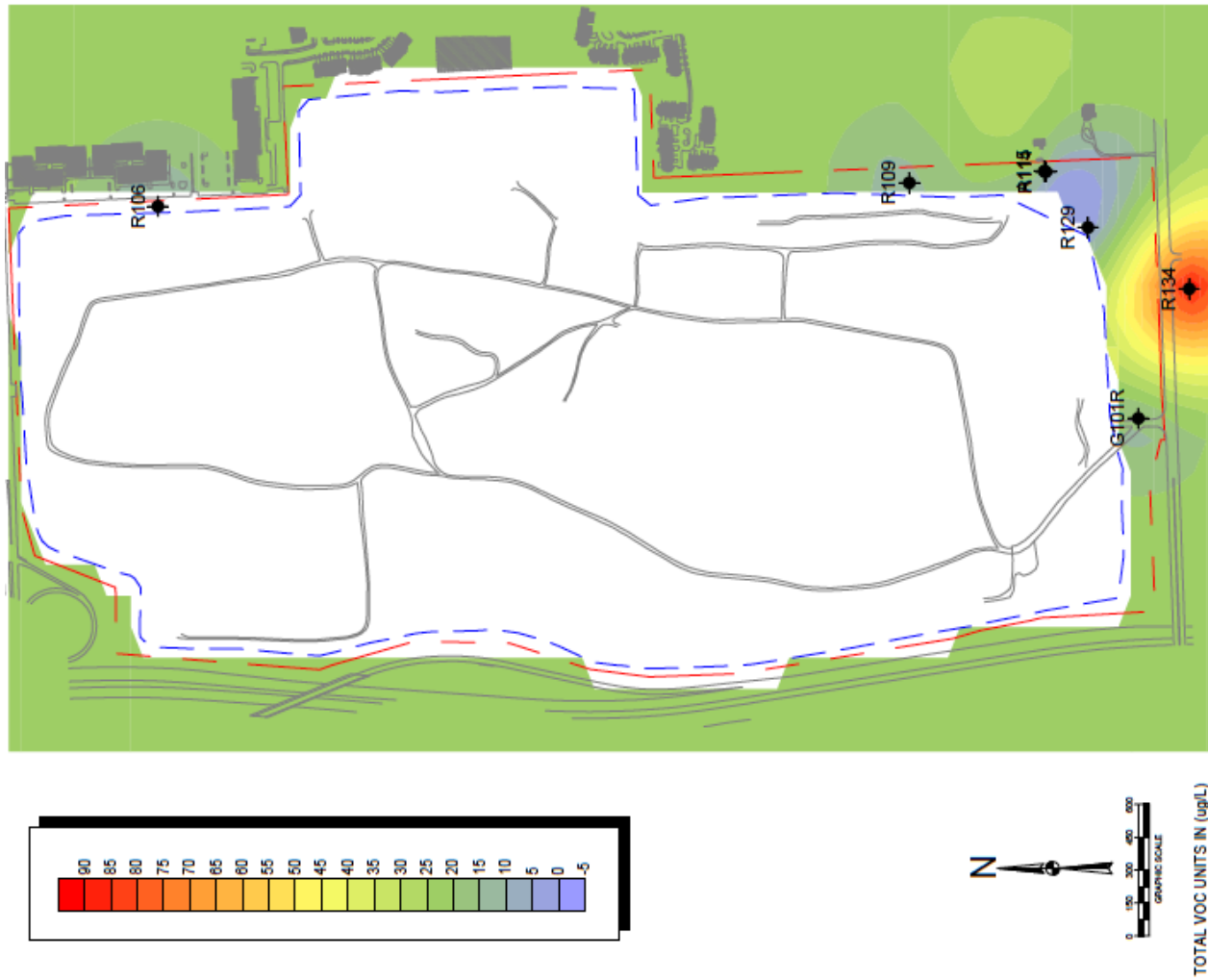
# Site Hydrogeology (original model)



# Example of Inconsistent Well Construction



# VOC Anomalies



# IEPA Requests Regulatory Status Change and GMZ

- Change in regulation from the remedial project section into the permit section.
- Establish a GMZ.
- Opportunity to revisit the accepted site geologic/hydrogeologic model.



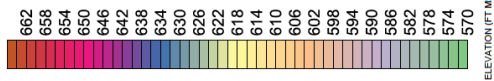
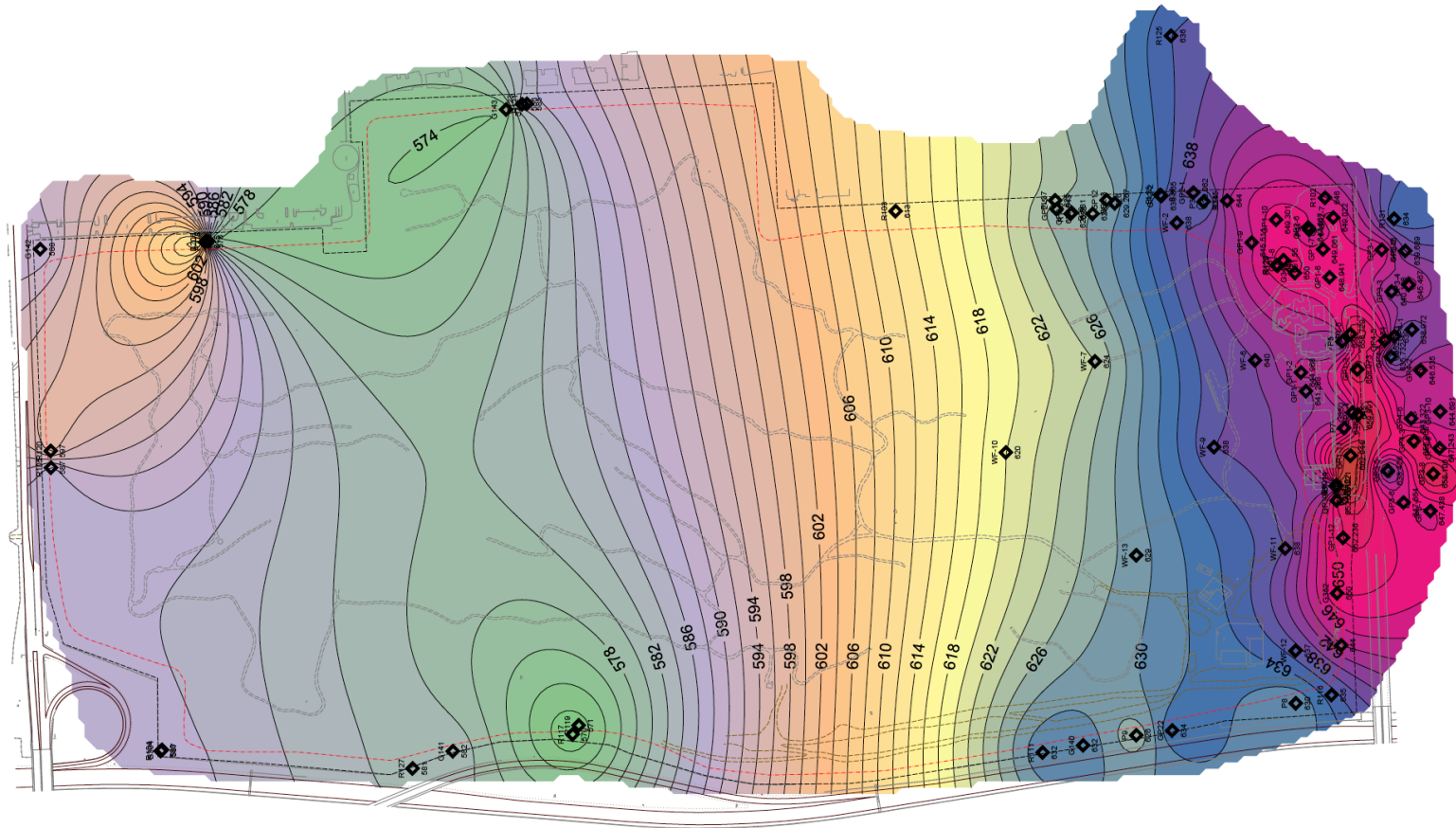
# New Investigations

(task I)

- New monitoring wells and stratigraphic borings.

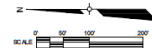


# Top of Bedrock

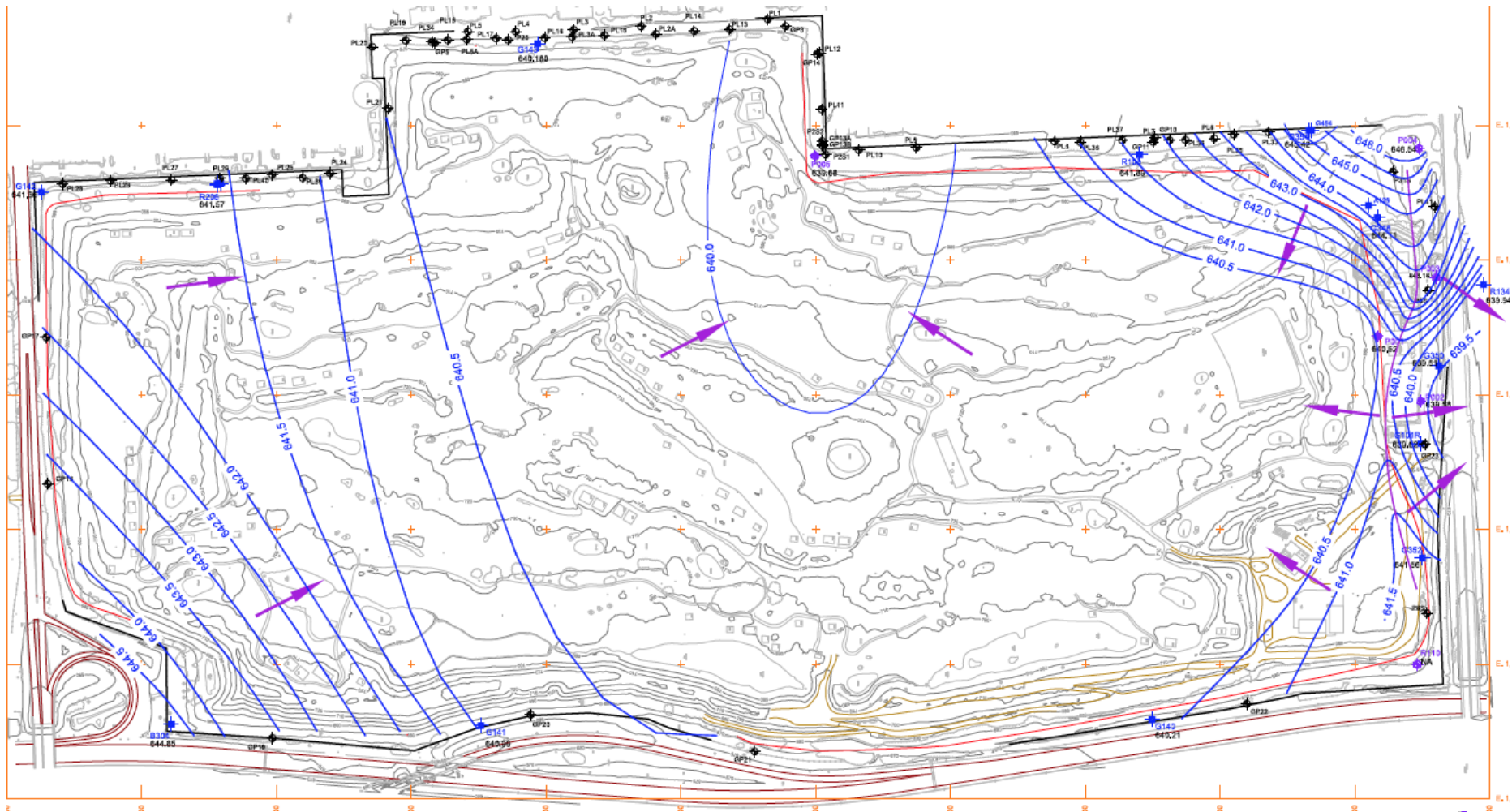


## LEGEND

- APPROXIMATE PROPERTY BOUNDARY
- - - - - APPROXIMATE LIMIT OF WASTE
- UNPAVED ROAD
- == PAVED ROAD
- FENCE



# Groundwater Flow



# New Investigations

(task 2)

- Establish a GMZ.
- Alternative methods considered.

# Beacon Environmental Services, Inc. (Beacon) Passive Soil Gas (PSG) System

(source: Beacon Environmental Services, Inc. website)

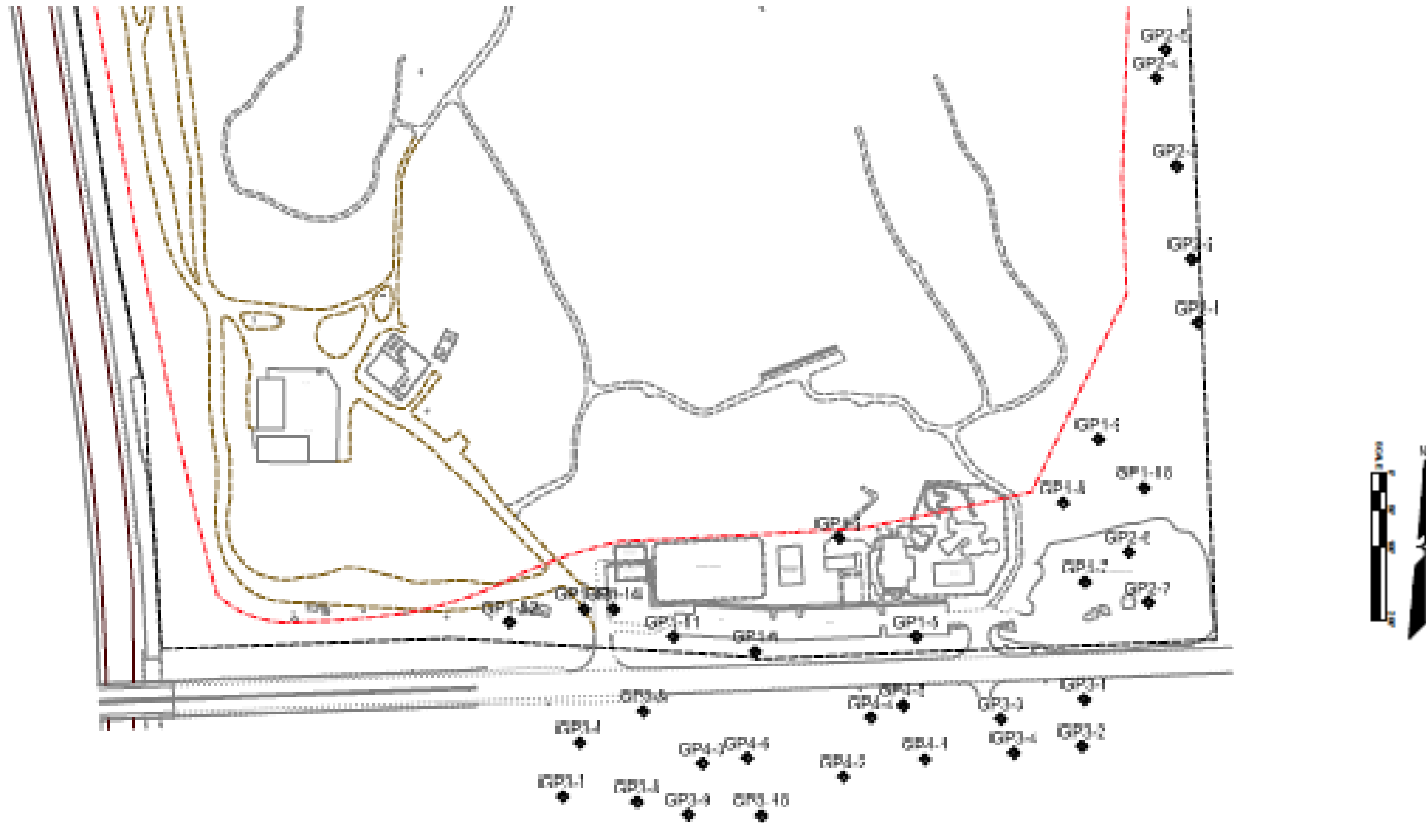
## The “BESURE” Sample Collection Kit™



# PSG Samplers (source: Beacon website)



# GMZ Investigation





# Investigation



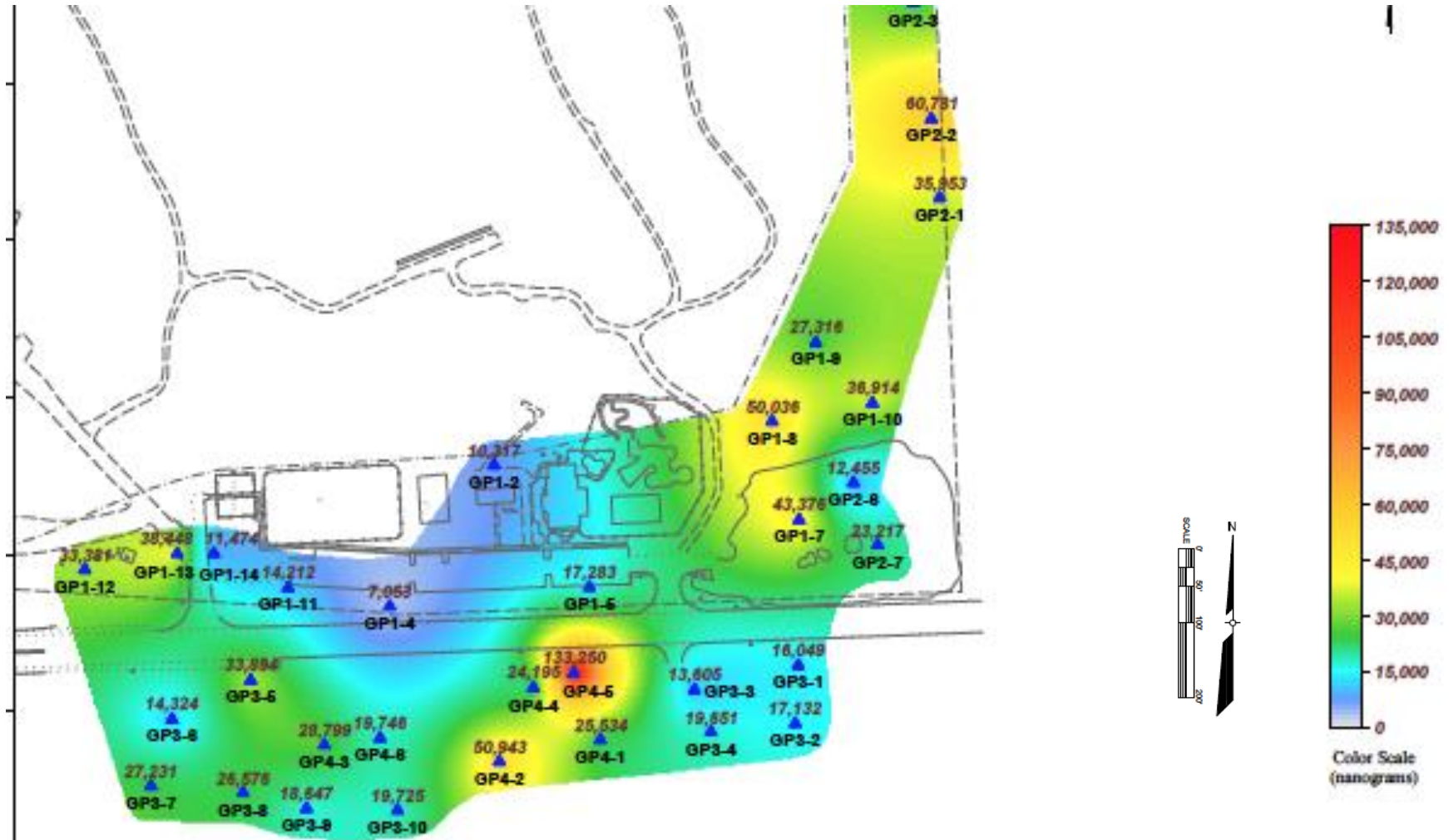
# Investigation



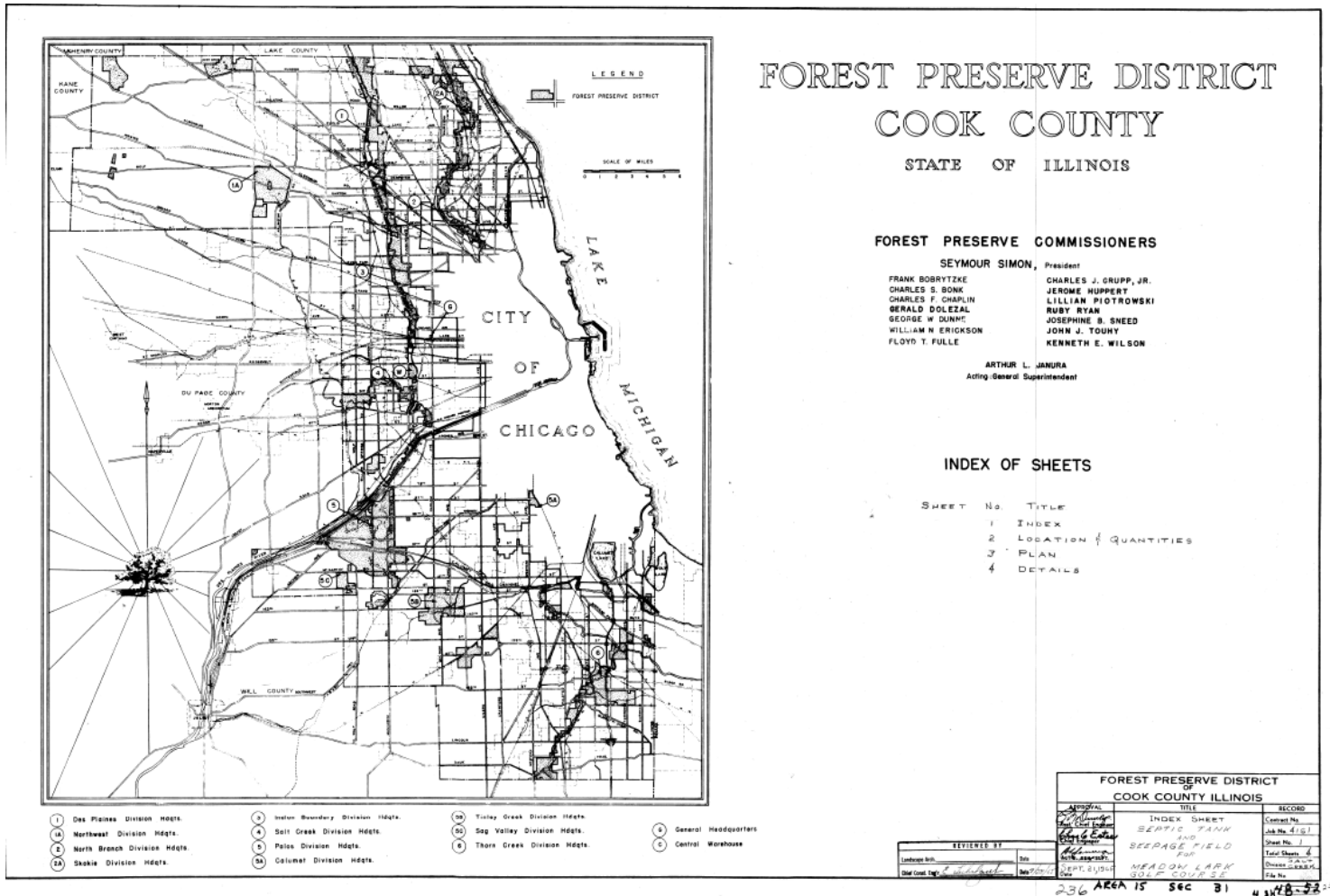
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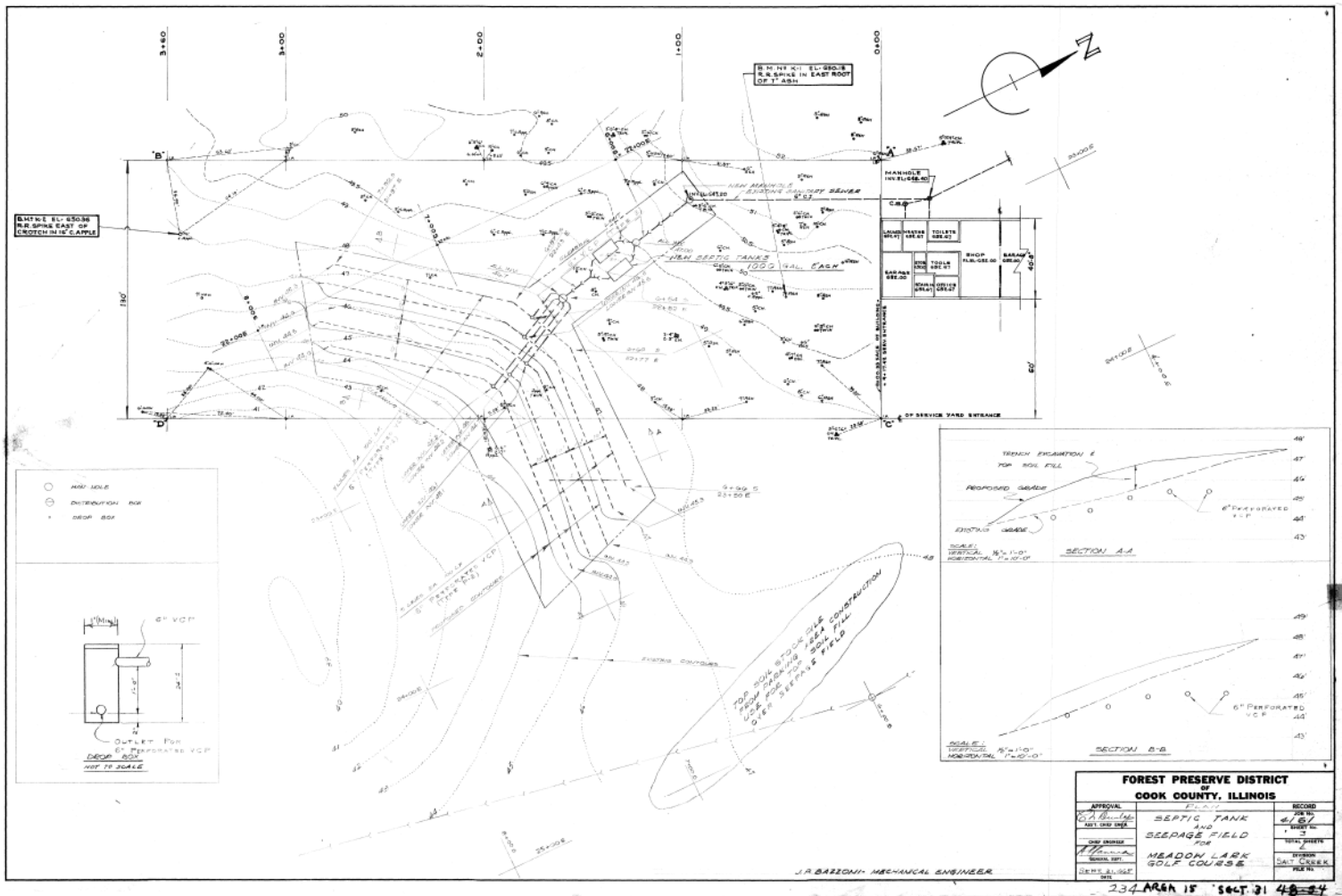
# Results - TPH



# Investigation Results



# Investigation Results





# Investigation Cost Comparison

<b>PSG Samplers, Analysis, Maps</b>	<b>\$7,500</b>
GeoProbe™ Subcontractor	\$6,000
Oversight	\$3,000
Reporting	\$3,000
<b>TOTAL =</b>	<b>\$20,000</b>
<b>Drilling Subcontractor</b>	<b>\$18,000</b>
Oversight	\$3,000
Well Development/Sampling	\$2,000
Analytical	\$600
Reporting	\$3,000
<b>Subtotal (Phase I)</b>	<b>\$27,000</b>
Similarly Scoped Phase 2	\$27,000
<b>TOTAL =</b>	<b>\$54,000</b>



# Summary and Conclusions

- Beacon PSG system was effective investigation tool.
- Reduced time and costs compared to traditional methods.
- State regulators were satisfied with results.



# Thank You!

A. Michael Hirt, P.G.

amhirteil@comcast.net

(630) 699-5881



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